Since these were discontinued in April last, their place has been supplied for the purpose of group numbering, on Schwabe's method, by rough sketches made from eye-observations with a refracting telescope of 3 inches apertures, using a power of 42.

There is a considerable falling off in the number of days of observation in 1872 as compared with 1871. This is accounted for in some measure by the greater prevalence of bad weather, but principally by the fact that during the chief part of the year, the observer not being exclusively engaged upon Sun-work, was unable to take advantage of temporary breaks in all clouds which offered themselves, the operation of mounting the telescope and making the drawing requiring more time than could always be spared from his other duties.

The system of eye-observation not having been decided upon until after the photographs ceased to be taken regularly, there is no comparative series between the two. There have, however, been several comparisons made at different times which tend to show the general accuracy of the sketches made by Mr. James Foster, one of the junior assistants at the Kew Observatory.

On an Apparatus for connecting the Hour Circle of the Equatoreal with the Regulator; and rendering audible the beat thereof. By Wentworth Erck, Esq.

The apparatus I am about to describe has now been in use on my own equatoreal for about a year, during which time it has been productive of so much comfort and convenience, that I have thought others might like to be made acquainted with it.

Its object is twofold,—

First, to keep the hour-circle constantly moving so as to show, at a fixed index, precisely the same time as that shown by the regulator.

Secondly, to render distinctly audible, even to deaf ears, the beats of the regulator.

Both these objects are effected by an electro-magnetic apparatus in which contacts are made by the vibration of the pendulum itself; whereupon the magnet attracts one end of a lever, the other end of which carries a pawl working in a ratched wheel on the axis of the endless screw that drives the hour-circle.

The hour-circle having 720 teeth, and the ratched wheel 120, if the latter receives an impulse every second, the former will revolve once in twenty-four hours; and this is what actually takes place.

The details of the mechanism by which this is effected are as follows: but I must premise that this circle is read in a very unusual way, though I venture to think a very much more convenient way than the usual one.

It is such a height from the floor, that by kneeling you can

see the whole of the southern surface of the circle unobstructed by the bearing of the polar axis.

For this axis projects some four inches beyond its southern bearing, the projecting portion being of gun-metal, cylindrical, and $1\frac{1}{4}$ inches in diameter; on this projecting portion of the axis, the hour-circle runs loose, its bearing also being 4 inches long, so as to impart steadiness to its movement.

The divisions are carried on a raised silver rim, about half an inch wide, projecting slightly below the southern surface of the circle, and affording space for a double set of divisions with a common set of figures between them.

The outer set of divisions are read off by a fixed vernier or index, in the meridian; and this index therefore, when the circle has been once set and kept in motion, always shows the clock time.

The inner set of divisions are read off by a pair of indices immovably fixed to the polar axis, and thus by mere inspection, without any calculation, show at once the apparent right ascension of any object to which the telescope may be directed; and, inasmuch as these indices and the hour-circle are relatively stationary, when the driving-clock is in gear, the right ascension can be read with ease and accuracy.

The reading-glasses are furnished with plain glass diagonal reflectors, and are carried round with the polar axis, so that they are always in position for reading; and by merely turning the reading-glass in its collar, you can perfectly illuminate the divisions at any hour-angle from a single fixed lamp.

The electro-magnetic apparatus, being of the very simplest form, scarcely requires description. The armature is at one end of a lever, at the other end of which is the pawl that works the ratched wheel; the arms of the lever being as 1 to 7.

The blows of the armature against the stops that prevents actual contact with the magnet, corresponding as they do with vibrations of the pendulum, rendered the latter most distinctly audible.

After many failures I succeeded in adapting to an existing clock a contact apparatus, which answers, I believe, as well as any thing of the kind can answer.

One of the battery wires is connected with the bracket which carries the pendulum; and the metallic communication is continued through the suspending spring into a small brass cube at the top of the pendulum rod. From opposite sides of this cube depend light springs, two inches long, having platinum terminals.

Screwed to the back of the clock-case, and connected with the other wire, is a small brass plate having two small pillars, 2 inches asunder, projecting forward; these pillars carry platinum-pointed screws in the plane of vibration, and opposite the terminals of the springs, so that, at each vibration, contact is made between a spring and a screw.

This interference with the pendulum has the effect of increas-

ing both the arc and the rate; the former to such a very small extent as to be immaterial; while the latter is under the control of the screw for adjusting the length of the pendulum.

But I suspect there is a constant, though very slow diminution of the corrected rate; whether due to the gradual consumption of the terminals, or to a gradual compression of imperfect springs, I am at present unable to say: but whatever owing to it is under control; you have only to advance the joints of the screws an exceedingly minute quantity.

The battery being only in action at the instant of contact there is not much consumption of materials. I find a single Daniell's cell exposing 3 square inches of zinc surface, and converting 15 grains into sulphate per hour, is quite sufficient to work the whole apparatus.

The battery is only put into operation when the equatoreal is in use; and at first I found some difficulty in having the battery always ready, at a moment's notice, at uncertain and long-separated intervals; also in keeping the fingers free from acid, &c. But these difficulties have been obviated by having the zinc plate of considerable length, and held in a kind of vice sliding on a rod, like a retort stand, which forms part of the circuit; thus the strength of the battery can be regulated, the same zinc will last a very long time, and there are no connexions to be made and unmade.

The porous pot, when not in use, is kept suspended by percha cords in a very large vessel of dilute acid, whence it can be filled, and emptied without touching it, the result of the whole matter being that in ten seconds I can without fail put the entire apparatus into working order.

Sherrington House, Bray, Co. Wicklow,
January 8, 1873.

Meteor observed at Mauritius.

By Mr. Wright.

(*Communicated by Mr. Meldrum, of the Mauritius Observatory.*)

On Thursday evening last, about 7 o'clock, I saw the most beautiful meteor fall that I ever remember observing in my life. My face was turned in the opposite direction, but an unusually brilliant and sudden flash of light, above the brightness of the moonshine, caused me to turn suddenly round in the direction the effulgence came from, and I saw a very large meteor majestically falling through the distance seemingly about 8 or 10 yards. I am not much of an astronomer, but I think it must have fallen (apparently) from some point in *Aquarius*. What particularly struck me in its appearance was, that it was beautifully distinct, and perfectly round as the full moon, but seemingly about the $\frac{1}{8}$th of a diameter larger. I ought, perhaps, rather to compare it to the moon at the end of her first quarter; for the lower quarter of